FORM PTO-1390 (REV 11-98)	U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 36-1358
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S APPLICATION NO. (If known, see 37 C.F.R. 1 5) 09/647736

INTERNATIONAL APPLICATION NO. PCT/GB99/01302	INTERNATIONAL FILING DATE 27 April 1999	PRIORITY DATE CLAIMED 1 May 1998

TITLE OF INVENTION

DISTRIBUTED DATA PROCESSING

APPLICANT(S) FOR DO/EO/US

LEBRE et al

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).

4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. A copy of the International Application as filed (35 U.S.C. 371(c)(2)).

    a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
    b. ☒ has been transmitted by the International Bureau.
    c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).

7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).

    a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
    b. ☐ have been transmitted by the International Bureau.
    c. ☐ have not been made; however, the time limit for making such amendments has **NOT** expired.
    d. ☐ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (U.S.C. 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. To 16. Below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98.

12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.

13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☐ A substitute specification.

15. ☐ A change of power of attorney and/or address letter.

16. ☐ Other items or information.

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5) 09/647736	INTERNATIONAL APPLICATION NO. PCT/GB99/01302	ATTORNEY'S DOCKET NUMBER 36-1358

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY

BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):

-- Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1000.00

-- International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO....................$860.00

-- International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but international search fee (37 C.F.R. 1.445(a)(2) paid to USPTO $710.00

-- International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)..............................$690.00

-- International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4)......................................$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =	$	860.00
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$	0.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE			
Total Claims	28	-20 =	8	X	$18.00	$	144.00
Independent Claims	7	-3 =	4	X	$80.00		320.00
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)				$270.00		$	0.00

TOTAL OF ABOVE CALCULATIONS =	$	1324.00
Reduction by ½ for filing by small entity, if applicable. A Small Entity Statement must also be filed (Note 37 C.F.R. 1.9, 1.27, 1.28).		0.00
SUBTOTAL =	$	1324.00
Processing fee of $130.00, for furnishing the English Translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(f)). +		0.00
TOTAL NATIONAL FEE =	$	1324.00
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). **$40.00** per property +	$	40.00
Fee for Petition to Revive Unintentionally Abandoned Application ($1240.00 – Small Entity = $620.00)	$	0.00
TOTAL FEES ENCLOSED =	$	1364.00

	Amount to be: refunded	$	
	Charged	$	

a. ☒ A check in the amount of $1364.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. 14-1140 in the amount of $_____ to cover the above fees. A duplicate copy of this form is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-1140. A duplicate copy of this form is enclosed.

d. ☒ The entire content of the foreign application(s), referred to in this application is/are hereby incorporated by reference in this application.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

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NAME

25,640
REGISTRATION NUMBER

October 4, 2000
Date

- 2 -

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

LEBRE et al   Atty. Ref.:   **36-1358**

Serial No.   **Unknown**   Group:

National Phase of   **PCT/GB99/01302**

Filed: **October 4, 2000**   Examiner:

For: **DISTRIBUTED DATA PROCESSING**

* * * * * * * * * * *

October 4, 2000

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Prior to calculation of the filing fee and in order to place the above identified

application in better condition for examination, please amend the claims as follows:

IN THE CLAIMS

Claims 4, 6 and 7, line 1 of each, delete "any preceding" and after "claim"

insert -- 1 --.

Claim 11, line 1, delete ",9 or 10".

Claim 12, line 1, delete "any one of claims 8 to 11" and insert -- claim 8 --.

Claim 15, line 1, delete "or 14".

Claim 16, line 1, delete "any one of claims 13 to 15" and insert -- claim 13 --.

Claim 18, line 1, delete "or 17".

Claim 19, line 1, delete "any one of claims 13 to 18" and insert -- claim 13 --.

Claim 23, line 1, delete "or 22".
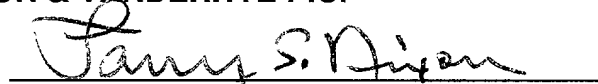
Claim 24, line 1, delete ", 22 or 23".

REMARKS

The above amendments are made to place the claims in a more traditional

format.

Respectfully submitted,

NIXON & VANDERHYE P.C.

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Distributed data processing

Field of the invention
This invention relates to a processing data in a distributed computing

5 environment.

Background
Data processing may be carried out in a distributed computing environment in
which client software interacts with server software, connected in a network. A

10 server can be considered to have a resource which is to be shared with a number
of clients which have an interest in it. The server waits for client initiated
requests and replies to them individually with information derived from the
resource requested by the client.

15 Conventionally, the client software is located at fixed workstations connected in
the network, which interacts with servers at fixed locations. More recently,
mobile agent software has been developed which allows the client software to
move to a location close to a server in order to make better use of the facilities of
the server. For example, if a manufacturing company has factories at two

20 different locations, with their own local computer networks, an operator at the
first location may wish to interrogate databases of servers at both locations to
determine e.g. the availability of certain stock items which may be held in
warehouses at the two locations.   In this situation, it is convenient for the client
data interrogation software to migrate from the first location to the second

25 location in order to be close to the server at the second location, to enable the
associated databases to be interrogated efficiently. The mobile client software is
known as a mobile agent.

A number of different systems which provide mobile agents have been

30 developed: MuBot by Crystaliz, Inc., Agent Tcl by Dartmouth College, Aglets
by IBM, MOA by the Open Group Inc, GMAF/Magna by GMD Fokus and
Odyssey by General Magic Inc.

Summary of the invention

In accordance with the invention, it has been appreciated that there are situations in which it would be advantageous to make the server mobile within a distributed computing environment.

In accordance with the invention there is provided a method of processing data in a distributed computing environment wherein a client and a server process data, the method comprising sending the server from a first place where it communicates with the client, through the distributed computing environment towards a second different place to perform data processing therefrom.

The method may include freezing incoming calls for data processing to the server at the first place whilst the server is being sent from the first place to the second place, and thereafter directing the frozen calls towards the second place to be processed by the server when it has become functional at the second place. This has the advantage of ensuring that connections are not lost to the server whilst it moves from the first place to the second place.

In another aspect, the invention includes, at the second place, receiving the server sent from the first place in order to perform data processing at the second place.

In order to transmit the server from the first place to the second place, it may be converted from an operational configuration at the first place into a configuration suitable for transmission through the distributed environment to the second place. The conversion may comprise serialisation of the server.

The invention also includes a software entity operable to provide a server for a client in a distributed computing environment characterised in that the software entity is selectively re-locatable to different places through the environment.

In another aspect, the invention includes a signal for transmission in a distributed computing environment wherein a client and a server process data, the signal comprising the server serialised for transmission between a first place where it communicates with the client, through the distributed computing

5   environment and a second different place to perform data processing.

The transmission of the server from the first place towards the second place may be controlled by a proxy and more particularly, the invention includes a proxy for use in a distributed computing environment wherein a client and a server

10   process data, the proxy being operable to send the server from a first place where it communicates with the client, through the distributed computing environment towards a second different place to perform data processing.

Brief description of the drawings

15   In order the invention may be more fully understood, an embodiment thereof will now be described way of example with reference to the accompanying drawings, in which:

Figure 1 is a schematic block diagram of a distributed computing environment which uses mobile software agents;

20   Figure 2 is a more detailed diagram of one of the hosts shown in Figure 1;

Figure 3 illustrates schematically the moving of a mobile server from a first place to a second place in accordance with the invention; and

Figure 4 is a schematic timing diagram of signal communication between the first place and the second place in respect of the movement of the server.

25

Detailed description

In the following description, the terminology adopted by the Object Management Group (OMG) for mobile agents has been adopted by way of convenient explanation. The OMG has defined a common standard for

30   interoperability of objects between different systems under a common object management architecture that provides an object request broker known commercially as CORBA which provides an infrastructure allowing objects to

converse independently of the specific platforms and techniques used to implement the objects. In order to deal with interoperability of mobile agents, the OMG has produced a document "Mobile Agent Facility Specification" 1st September 1997, OMG TC Document orbos/97-09-20, available from the

5 Object Management Group, 492 Old Connecticut Path, Framingham, MA 01707, USA. Members of OMG can also find the full specification at the following URL:

http://www.omg.org/library/schedule/Mobile_Agents_Facility_RFP.htm.
This will now be explained with reference to Figures 1 and 2.

10

For mobile software agents, which are clients, the world is made up of regions which include places between which the mobile agent can move. Referring to Figure 1, first and second host computing systems 1, 2 are interconnected by a network 3. The first and second host systems can be of any suitable form e.g.

15 local area networks, individual computers and the like, which each operate with their own operating system *OS1*, *OS2*. In a conventional manner, the individual hosts 1, 2, may include one or more computers or processors, each of which include a processor, volatile working memory and non-volatile data storage. Each host is provided with a communications interface *CI1*, *CI2* to allow

20 communication between them via the network 3. The network 3 can be of any suitable form, for example a wide area network, a local area network, intranet or Internet.

Considering the host 1, its operating system *OS1* provides an environment in

25 which software can operate. The client software is configured as mobile software agent *MA1*. Similarly, the host 2 has an operating system *OS2* and a mobile agent *MA2*. A further mobile agent *MAn* is shown in host 1. Each mobile agent *MA* is operative at a place *P*. Thus, considering the host 1, mobile agent *MA1* is operative at place *P1* and mobile agent *MAn* is operative at place

30 *Pn*. Mobile agent *MA2* is at place *P2* in host 2. The mobile agents can move from place to place. It will be understood that in host 1, the places *P* may be individual computers connected in a network that comprises host 1 or any other

suitable hardware configuration, which will not be described further herein. The same is true for host 2. The OMG mobile agent specification is designed to provide interoperability between different operating systems in order to allow transport of mobile client agents from one host to another. It is assumed in the

5 configuration of Figure 1 that different operating systems OS1, OS2 are in use although this is not an essential feature of the invention. It will be appreciated that the OMG specification makes use of CORBA to allow interoperability between different hardware and software configurations. The agents operating within the operating system OS1 define an agent system AS1 in host 1. A

10 similar agent system AS2 operates in host 2 shown in Figure 1.

The software process is arranged in a client-server configuration as will now be explained with reference to Figure 2. Conveniently, but not necessarily, the software may be object oriented such that the mobile client agents and the

15 servers can each be considered as objects. As shown in Figure 2, server software MS 1 is shown at place P1 which can service calls from the mobile clients described with reference to Figure 1. For example, the mobile agent MA1 is a client at place P1 and can make data calls on the server MS 1 over path 4 to perform data processing. The client and server do not however need to be

20 located at the same place P. Thus, in the example of Figure 2, the server MS1 can service data calls from mobile client agent MA 2 at place P2 over communication path 5. It will be understood that there may be more than one server MS in the distributed computing environment.

25 In accordance with the invention, the server MS 1 is mobile within the distributed computing environment. In order to manage the mobility of the mobile server MS 1 , it is given a software proxy pr 1 which is different in each place P. The proxy pr 1 is advertised to CORBA with the mobile server interface, instead of the mobile server itself. All processing calls for the server go

30 to the proxy first and are then redirected by it to the server. Therefore, the proxy pr 1 knows at all times how many clients are connected to the server MS 1 and how many calls are in progress.

Referring to Figure 3, there are situations where it would be convenient to move the server agent *MS1* from place *P1* to place *P2* via the communication interface *CI1*, network 3 and interface *CI2*. For example, the server *MS 1* could then

5 function with enhanced operability with client *MA 2* residing in the agent system *AS2* in host 2. The transfer of the server *MS 1* from place *P1* to place *P2* will now be described in detail with reference to Figure 4.

Initially, when the mobile server *MS 1* decides or is told to move from place *P1*,

10 at step S.0, it tells its proxy *pr1* the place to which it is to be moved. In this case, the mobile server *MS1* is to be moved to place *P2*. Alternatively, the proxy *pr1* may be told by some external third party to move the mobile server. The moving process then starts.

15 At step S.1, the proxy *pr1* freezes all incoming calls for data processing to the mobile server *MS 1*.

At step S.2, the proxy *pr1* waits until all current data processing handled by mobile server *MS 1* has finished.

20
Then, at step S.3, the proxy *pr1* tells mobile server *MS 1* that it is about to be moved and that it must perform any task needed to be completed before leaving place *P1*.

25 Then, at step S.4, the proxy causes the mobile server *MS 1* to be serialised, namely to convert it from its operational state into a condition suitable for transmission through the network 3 (Figure 1).

Then, at step S.5, the serialised mobile server is sent to the place *P2* of host 2 via

30 communications interface CI1, network 3 and communications interface CI2.

At step S.6, a new proxy *pr1'* is produced in place *P2* for the mobile server *MS1*

when located in place *P2*.

At step S.7, the mobile server *MS1* is de-serialised at place *P2* and thereby recreated in an operational condition.

At step S.8, the newly created proxy *pr1'* sends back locational reference data for mobile server *MS1*, so as to indicate to the proxy *pr1*, the new CORBA reference of mobile server *MS1*.

Then, at step S.9, the calls frozen at step S.1 are forwarded to the mobile server *MS1* through the network 3, by proxy *pr1*, from place *P1* to place *P2*.

The procedure described with reference to Figure 4 has the advantage that communication with the mobile server *MS 1* is not lost during the transfer process. The steps ensure that any data processing carried out at place *P1* is completed before the transfer occurs and, whilst the transfer is taking place, incoming calls are frozen and then transferred to the new place.

Clients can find the moved mobile server *MS 1* by making an appropriate request, as for any other CORBA object, and will receive the reference of its proxy. The proxy that is advertised for the mobile agent can either be the first one *pr1*, in which case calls will be directed from *pr1* to *pr1'*, or *pr1'* itself.

At the completion of the moving process for the mobile server, the proxy *pr 1* is no longer needed and is cancelled.

It will be understood that client agents such as agent *MA2* shown at place *P1* in Figure 3 can be mobile in a conventional manner, in accordance with the OMG specification for mobile agents. Thus, client agent *MA2* can be moved in a conventional manner by serialising the agent, transmitting it through the network 3 to a different place and de-serialising the agent at the new place. Thus, it is possible according to the invention to move an entire client - server

combination from one place to another or to different places.

It will be understood that the mobile server MS1 when at a particular place, will reside in the working memory of a particular computer within the host, and

5 may if required be stored in the non-volatile memory of the computer associated with the place P, to provide a record thereof if the network or a part thereof is shut down.   The mobile server may also be provided on a storage medium such as an optical or magnetic disc, so that it can be loaded into a computer at a particular place P, and then commence its mobile activities in the network.

10

Whilst the previously described clients and servers may conveniently be configured as software objects in an object oriented environment, this is not essential and they can be configured as batches of conventional code. Also, whilst the invention has been described in relation to CORBA object

15 management architecture, other management architectures could be used such as OLE by Microsoft, suitably configured to handle mobile objects

Movement of the server in accordance with the invention renders the computing process much more flexible. For example in an Internet application, if a large

20 number of clients in the United Kingdom are calling a server which is located at a place in the USA, a large number of transatlantic calls would need to be set up, leading to inefficiencies. In accordance with the invention, the server object can migrate from a place in the USA to a place in the United Kingdom, speeding up execution of the individual client/server processes.

Claims

1.   A method of processing data in a distributed computing environment
wherein a client and a server process data, the method comprising sending the
server from a first place where it communicates with the client, through the
distributed computing environment towards a second different place to perform
data processing therefrom.

2.   A method according to claim 1 including freezing incoming calls for data
processing to the server at the first place whilst it is being sent from the first
place to the second place, and thereafter directing the frozen calls towards the
second place to be processed by the server when it has become functional at the
second place.

3.   A method according to claim 2 including waiting for the server to
complete its current processing tasks before sending it to the second place.

4.   A method according to any preceding claim including converting the
server from an operational configuration at the first place into a configuration
suitable for transmission through the distributed environment to the second
place.

5.   A method according to claim 4 wherein the conversion comprises
serialisation of the server.

6.   A method according to any preceding claim including creating a proxy
for the server at the first place, which controls the sending of the server towards
the second place.

7.   A method according to any preceding claim including sending the client
towards a different place in the distributed computing environment.

8.   A method of processing data in a distributed computing environment wherein a client and a server process data, the method comprising receiving the server sent from a first place where it communicated with the client, through the distributed computing environment, at a second different place, to perform data processing at the second place.

9.   A method according to claim 8 wherein the server is received at the second place in a form suitable for transmission through the distributed environment, and including converting the received server at the second place into a form suitable for processing data at the second place.

10.   A method according to claim 9 wherein the converting includes deserialising the server.

11.   A method according to claim 8, 9 or 10 including producing a proxy for the received server, at the second place.

12.   A method according to any one of claims 8 to 11 including receiving at the second place, data processing calls for the server directed thereto from the first place after the server has become operational at the second place.

13.   A software entity operable to provide a server for a client in a distributed computing environment **characterised in that** the software entity is selectively re-locatable to different places through the environment.

14.   An entity according to claim 13, operable to function as the server at a first place in the environment and then to re-locate and function as the server at a second place in the environment.

15.   An entity according to claim 13 or 14, operable such that data calls thereto from a client are frozen during the re-location.

16. An entity according to any one of claims 13 to 15 operable to provide a proxy functional to send the server through the environment to achieve the relocation.

17. An entity according to claim 16 wherein the proxy is functional to wait for the server to complete its current processing tasks before commencing the relocation.

18. An entity according to claim 16 or 17 wherein the proxy is operable to serialise the server from its functional configuration into a configuration suitable for transmission through the distributed environment so as to achieve the relocation.

19. A software entity according to any one of claims 13 to 18, stored on a storage medium.

20. A signal for transmission in a distributed computing environment wherein a client and a server process data, the signal comprising the server serialised for transmission between a first place where it communicates with the client, through the distributed computing environment and a second different place to perform data processing.

21. A proxy for use in a distributed computing environment wherein a client and a server process data, the proxy being operable to send the server from a first place where it communicates with the client, through the distributed computing environment towards a second different place to perform data processing.

22. A proxy according to claim 21 operable to freeze incoming calls for data processing to the agent at the first place whilst it is being sent from the first place to the second place, and thereafter to direct the frozen calls towards the second place to be processed by the server when it has become functional at the second

place.

23.   A proxy according to claim 21 or 22 operable to wait for the server to complete its current processing tasks before sending it to the second place.

24.   A proxy according to claim 21, 22 or 23 operable to serialise the server from an operational configuration at the first place into a configuration suitable for transmission through the distributed environment to the second place.

25.   A host provided with client and server objects for processing data in an object oriented distributed processing environment **characterised in that** the server object is selectively re-locatable to different places in the environment.

26.   A host according to claim 25 wherein the mobile server object is operable such that data calls thereto are frozen during the relocation.

27.   A host according to claim 25 wherein the server is provided with a proxy compatible with CORBA or OLE architecture.

28.   A server object for processing data in an object oriented distributed processing environment **characterised in that** the server object is re-locatable for operation at different places and is provided in use with a proxy which freezes data calls thereto during the relocation and subsequently forwards them to the moved server object.

Abstract

Data is processed in a distributed environment, using client and server objects. The server object (MS1) is mobile and can be serialised under control of a proxy (*pr1*) and moved from a first place (*P1*) to a second place (*P2*). During re-

5 location, calls to the mobile server are frozen and redirected to the new location when the server becomes ready for use at the second place (*P2*).
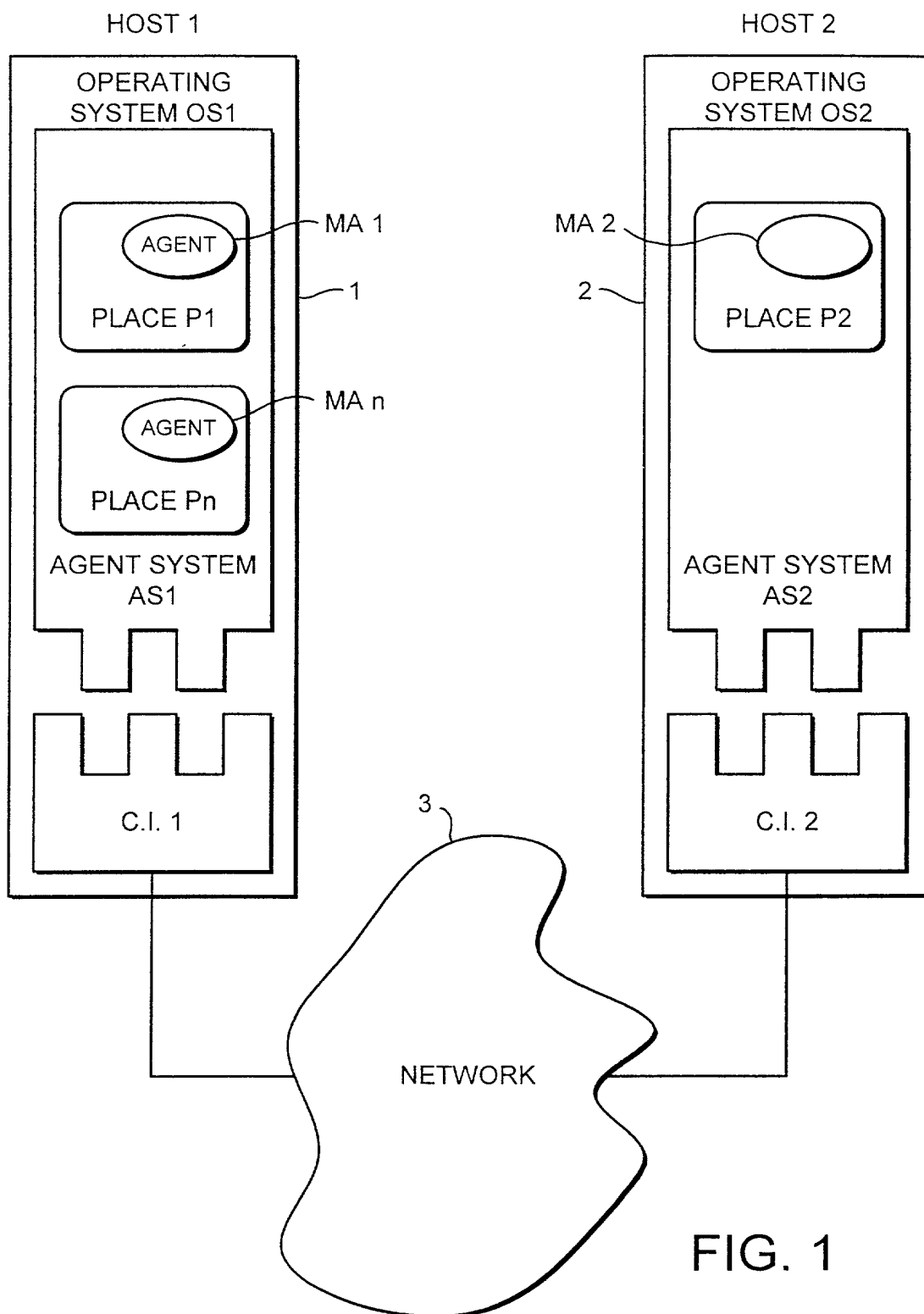
HOST 1
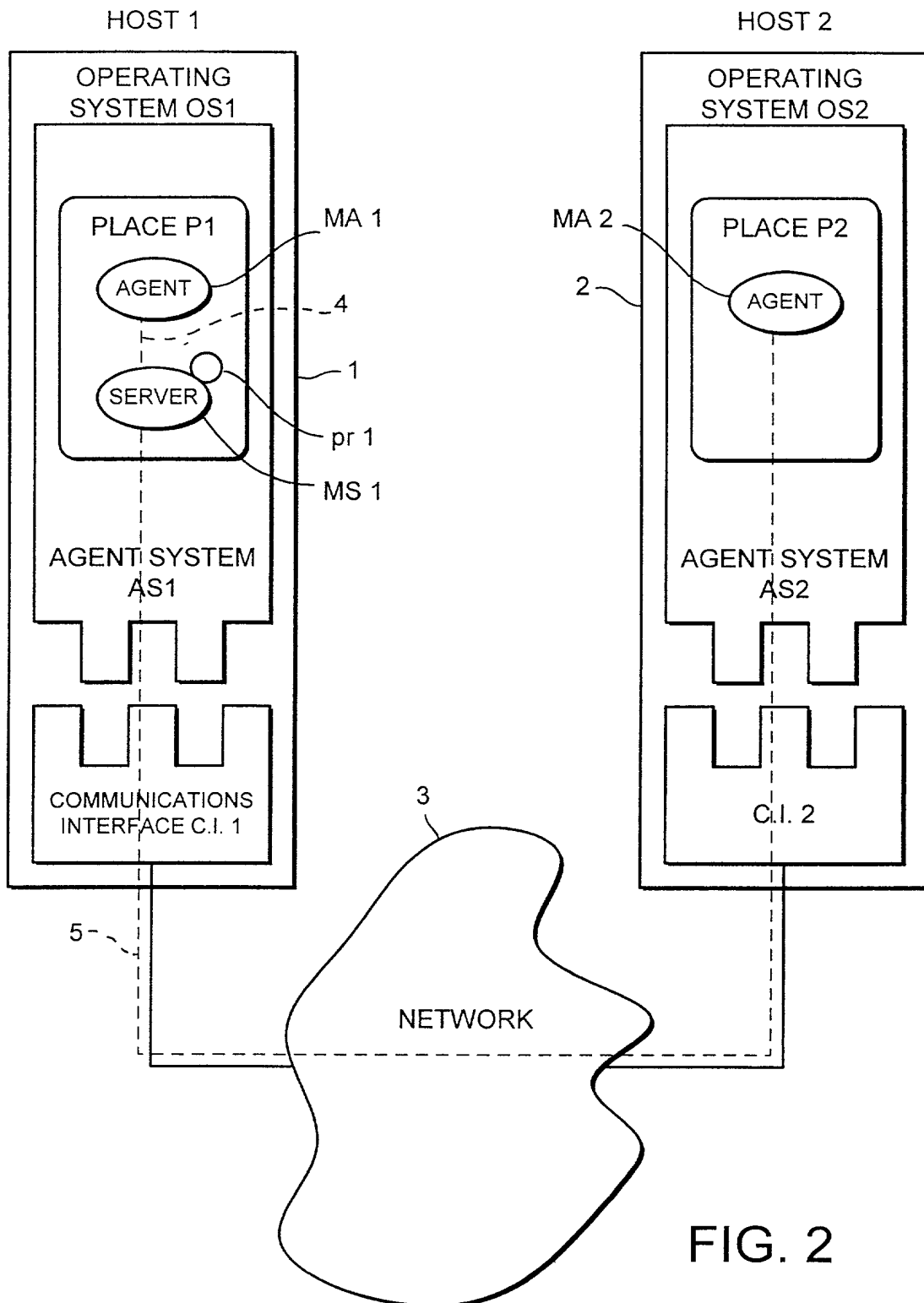
OPERATING
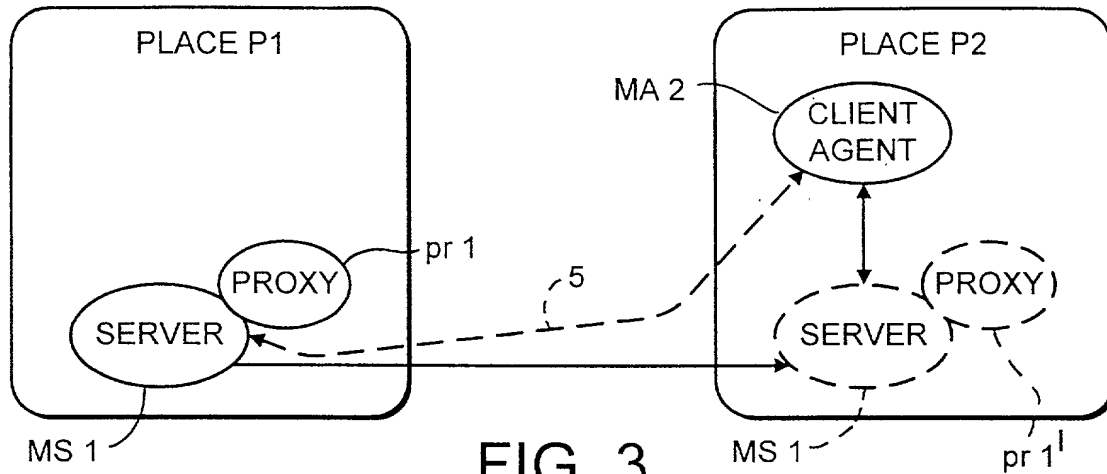SYSTEM OS1

AGENT — MA 1

PLACE P1 — 1

AGENT — MA n

PLACE Pn

AGENT SYSTEM
AS1

C.I. 1

HOST 2

OPERATING
SYSTEM OS2

MA 2 —

2 —

PLACE P2

AGENT SYSTEM
AS2

C.I. 2

3

NETWORK

FIG. 1

09/647736

FIG. 2

PLACE P1

PLACE P2

MA 2

CLIENT
AGENT

pr 1

PROXY

PROXY

SERVER

SERVER

MS 1

MS 1

pr 1'

5

FIG. 3

PLACE 1

PLACE 2

MOBILE
SERVER MS 1

PROXY pr 1

S. 0 TELL PROXY
ABOUT MOVE

S. 1 FREEZE
INCOMING CALLS

S. 2 WAIT UNTIL
CURRENT CALLS
HAVE FINISHED

S. 3 TELL MS 1
THAT IT IS TO
BE MOVED

S. 4 SERIALISE
MS PROCESS

S. 5 SEND MS 1
TO PLACE 2

S. 6 CREATE
NEW PROXY

S. 7 DESIRABLE
MS 1

S. 8 SEND BACK
REFERENCE OF MS 1

S. 9 FORWARD
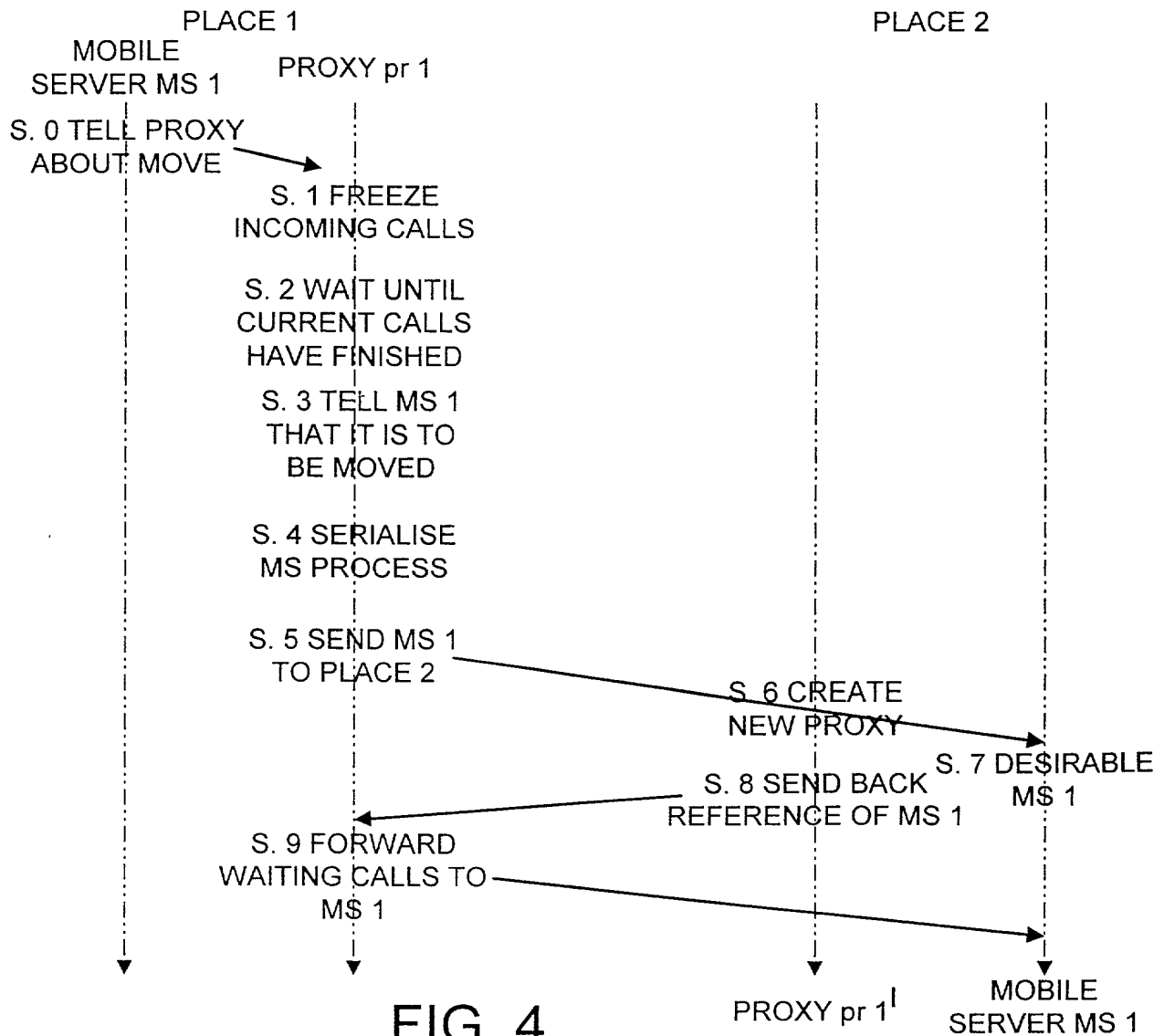WAITING CALLS TO
MS 1

PROXY pr 1'

MOBILE
SERVER MS 1

FIG. 4

RULE 63 (37 C.F.R. 1.63)
DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **DISTRIBUTED DATA PROCESSING**
the specification of which (check applicable box(es)):
[ ] is attached hereto.
[ ] was filed on _____ as U.S.Application Serial No. _____
[x] was filed as PCT international application No. PCT/ **GB99/01302** on **27 APRIL 1999**
and (if applicable to U.S. or PCT application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with 37 C.F.R. 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed or, if no priority is claimed, before the filing date of this application:

Prior Foreign Application(s):

Application Number	Country	Day/Month/Year Filed
9809512.8	GREAT BRITAIN	1 May 1998

I hereby claim the benefit under 35 U.S.C.$119(e) of any United States provisional application(s) listed below.

Application Number	Day/Month/Year Filed

I hereby claim the benefit under 35 U.S.C. 120/365 of all prior United States and PCT international applications listed above or below and, insofar as the subject matter of each of the claims of this application is not disclosed in such prior applications in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56 which occurred between the filing date of the prior applications and the national or PCT international filing date of this application:

Prior U.S./PCT Application(s):

Application Serial No.	Day/Month/Year Filed	Status: patented, pending, abandoned
PCT/GB 99/01302	27 APRIL 1999	PENDING

I hereby declare that all statements made herein of my own knowledge are true and that statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon. And I hereby appoint **NIXON & VANDERHYE P.C., 1100 North Glebe Road, 8th Floor, Arlington, VA 22201-4714, telephone number (703) 816 -4000 (to whom all communications are to be directed)**, and the following attorneys thereof (of the same address) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent: Arthur R Crawford, 25327; Larry S. Nixon, 25640; Robert A. Vanderhye, 27076; James T. Hosmer, 30184; Robert W.Faris, 31352; Richard G Besha, 22770; Mark E. Nusbaum, 32348; Michael J. Keenan, 32106; Bryan H. Davidson, 30251; Stanley C.Spooner, 27393; Leonard C. Mitchard, 29009; Duane M. Byers, 33363; Paul J. Henon, 33626; Jeffry H. Nelson, 30481; John R. Lastova, 33149; H. Warren Burnam Jr., 29366; Thomas E. Byrne, 32205; Mary J. Wilson, 32955; J. Scott Davidson, 33489; Alan M. Kagen, 36178; William J. Griffith, 31260; Robert A. Molan, 29834.

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FOR ADDITIONAL INVENTORS, check box [X] and attach sheet with the same information and signature and date for each.